

<p align="center">19 ION CHROMATOGRAPHY</p>	<p align="center">Page 1 of 2</p>
<p align="center">Division of Forensic Science</p> <p align="center">TRACE EVIDENCE TRAINING MANUAL</p>	<p align="center">Amendment Designator:</p>
	<p align="center">Effective Date: 29-March-2004</p>
<p align="center">19 ION CHROMATOGRAPHY</p> <p>19.1 Introduction to Ion Chromatography (IC)</p> <p>19.1.1 Objectives</p> <p>Through completion of this module the trainee will have developed and demonstrated theoretical knowledge and/or practical skills to:</p> <ul style="list-style-type: none"> • Basic IC terminology; • The theory and basic design of the instrument; • Sample preparation techniques; • The interpretation of results; • The capabilities and limitations of the instrument; • QA/QC procedures; and, • Basic troubleshooting. <p>19.1.2 Required Readings</p> <p>19.1.2.1 Conlon, R. D., Ettre, L. S., and Yost, R. W., <u>Practical Liquid Chromatography - An Introduction</u>, Perkin-Elmer Corporation: Norwalk, CT, 1980.</p> <p>19.1.2.2 Glajch, J. L., Kirkland, J. J., and Snyder, L. R., <u>Practical HPLC Method Development</u>, John Wiley and Sons, Inc., New York, NY, 1988.</p> <p>19.1.2.3 Kirkland, J. J., and Snyder, L. R., <u>Introduction to Modern Liquid Chromatography</u>, John Wiley and Sons, Inc., New York, NY, 1974.</p> <p>19.1.2.4 Shipgun, O. A., and Zolotov, Yu A., <u>Ion Chromatography in Water Analysis</u>, Ellis Horwood Limited, Chitcester, England, 1988.</p> <p>19.1.2.5 Smith, Robert E., <u>Ion Chromatography Applications</u>, 2nd ed., CRC Press, Inc, Boca Raton, FL, 1988.</p> <p>19.1.2.6 Weiss, Joachim, <u>Handbook of Ion Chromatography</u>, Dionex Corporation, Sunnyvale, CA, 1986.</p> <p>19.1.3 Questions</p> <p>The trainee will provide written answers to the following questions:</p> <ul style="list-style-type: none"> • What is ion chromatography and what information can be obtained from this technique? • Diagram a typical IC. Explain the purpose of each component. • Explain how separation occurs in the column and what factors affect separation. • What column and mobile phase is used when analyzing for anions? Perchlorate? Cations? • Diagram the suppressor and explain how it works. • How do absorbance, electrochemical, and conductivity detectors work? • Compare HPLC with IC. • What are the IC's limitations? <p>19.1.4 Practical Exercises</p> <p>19.1.4.1 The trainer will demonstrate the operation of the instrument, anion and cation, to the trainee. The trainee will observe at least one complete set-up and analysis of IC samples.</p>	

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<p>19.1.4.2 The trainer will provide to the trainee a set of 10 anion solutions and a set of 10 cation solutions. The trainee will analyze these solutions which will be properly diluted for comparison with the anion standard.</p> <p>19.1.4.3 The trainee will demonstrate to the trainer how to convert the IC from anion to cation analysis.</p> <p>19.1.4.4 The trainee will given a minimum of five samples to analyze by IC. These samples will include both anions and cations.</p> <p>19.1.5 Evaluation</p> <p>19.1.5.1 The trainer will review the written answers to the questions with the trainee.</p> <p>19.1.5.2 The trainer and the trainee will review and discuss the pertinent points of each of the required readings.</p> <p>19.1.5.3 Review of practical exercises.</p> <p>19.1.5.4 The trainee will be quizzed orally upon the subject matter.</p> <p>19.2 Competency Evaluation and Mock Trial</p> <p>The trainee will use ion chromatography when completing their subdiscipline competency test and will defend their results as a part of their mock trial in that subdiscipline.</p> <p>19.3 Reading List</p> <p>19.3.1 Conlon, R. D., Ettre, L. S., and Yost, R. W., <u>Practical Liquid Chromatography - An Introduction</u>, Perkin-Elmer Corporation: Norwalk, CT, 1980.</p> <p>19.3.2 Glajch, J. L., Kirkland, J. J., and Snyder, L. R., <u>Practical HPLC Method Development</u>, John Wiley and Sons, Inc., New York, NY, 1988.</p> <p>19.3.3 Kirkland, J. J., and Snyder, L. R., <u>Introduction to Modern Liquid Chromatography</u>, John Wiley and Sons, Inc., New York, NY, 1974.</p> <p>19.3.4 Shipgun, O. A., and Zolotov, Yu A., <u>Ion Chromatography in Water Analysis</u>, Ellis Horwood Limited, Chitcester, England, 1988.</p> <p>19.3.5 Smith, Robert E., <u>Ion Chromatography Applications</u>, 2nd ed., CRC Press, Inc, Boca Raton, FL,1988.</p> <p>19.3.6 Joachim, <u>Handbook of Ion Chromatography</u>, Dionex Corporation, Sunnyvale, CA, 1986.</p> <p align="right">◀End</p>	